

National Aeronautics and
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LAGNIAPPE

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CRSP, USDA workshop seeks to find ways to aid U.S. agricultural growers

Representatives from four major agricultural grower associations, representing 115,000 farmers, came to Stennis Space Center Aug. 12 and 13, to work with NASA and the United States Department of Agriculture (USDA) in crafting a national strategy to help farmers improve their planting, fertilizing and harvesting methods.

"The overriding goal of this unprecedented meeting is to spend less and grow more," said David Brannon, program manager of NASA's Commercial Remote Sensing Program (CRSP) at Stennis. "By bringing remote sensing technology and variable-rate precision farming technology together, we will be able to provide farmers with information about crops and their condition."

Representatives of the National Corn Growers Association, National Cotton Council, American Soybean Association and National Association of Wheat Growers met with Brannon; U.S. Undersecretary of Agriculture for Research, Education and Economics, Dr. Miley Gonzales; and Associate Administrator of NASA's Office of Earth Science, Dr. Ghassem Asrar.

They hope to find ways of expanding early results of farmers like Mississippian



NASA and the U.S. Department of Agriculture met with representatives from four major agricultural grower associations, representing 115,000 farmers, at Stennis Space Center Aug. 12 and 13. The workshop was designed to inform the industry on the use of satellites to determine soil and crop needs. Leading the workshop, from left, was David Brannon, program manager of NASA's Commercial Remote Sensing Program at Stennis; Dr. Miley Gonzales, Undersecretary of Agriculture for Research, Education and Economics; and Dr. Ghassem Asrar, associate administrator of NASA's Office of Earth Science.

Ken Hood, owner of Perthshire Farms, to more farmers across the country.

Hood, who grows cotton and soybeans on his 12,000-acre farm in Gunnison, has worked with Stennis' CRSP office by utilizing information taken from remote sensing imagery to improve his farming techniques.

"Remote sensing has opened up avenues for cost-savings," said Hood, whose farm has served as a test site for three years. "I've increased my yields. Because of remote sensing, I am better able to utilize my chemical applications. I used to

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A 250,000-pound thrust hybrid rocket motor underwent its first successful long-duration firing Aug. 13 at NASA's John C. Stennis Space Center in south Mississippi on the E1 test stand. The motor, which represents a new way of doing business for NASA, was designed and constructed by members of the Hybrid Propulsion Demonstration Program consortium. Companies involved in the consortium are: Lockheed Martin Astronautics, Boeing Rocketdyne, Lockheed Martin Michoud Space Systems, Thiokol Corporation and United Technologies Chemical Systems Division. (See Story Page 3)

LAGNIAPPE Commentary

Camille changed destiny for Stennis . . .

It has been 30 years since the winds of Hurricane Camille struck with a fury beyond the pages of catastrophic history to devastate the Mississippi Gulf Coast.

This mother of all hurricanes to ever hit the United States mainland came ashore during the predawn hours of Aug. 17, 1969, and left a terrifying memory that will never be forgotten by the people who survived its wrath.

Ironically, with all of its death and destruction, Camille did step in and change the destiny of Stennis Space Center, known then as the National Space Technology Laboratories (NSTL), in a way that was hard to imagine for those who woke up to find many of their loved ones and neighbors killed and their homes destroyed.

There was hardly a home, business establishment, shopping center, motel or hotel left standing from Waveland to Biloxi when Camille's howling 200-mile-per-hour winds finally subsided. The unbelievable winds, pushing a 27-foot tidal wave, literally disintegrated "hurricane-proof" structures and washed their remains hundreds of yards from their foundations. Even ocean-going ships were hurled ashore, coming to rest across U.S. Highway 90.

The eye of the great storm passed right over the mouth of the Bay of St. Louis, as predicted by NASA weatherman Lee Nybo, leaving a wake of death and disaster from one end of the Mississippi coast's 26-mile-long beach to the other.

When daylight finally came and revealed the awful handiwork of the awesome storm, then director Jackson Balch mobilized the entire NASA-contractor work force to help their neighbors along the coast deal with the destruction. NASA and contractor employees, who had just begun to celebrate the Apollo 11 lunar landing July 20 of that year, became heroes in the eyes of their stricken neighbors along the coast.

Rocket engineers and technicians became bulldozer and truck drivers, laborers moving mountains of debris, and helpers providing drinking water and food to the thousands of needy coastians. They even helped hoist hundreds of American flags at each site of devastation as a symbol of determination and courage and to say to all, "We will return!"

And return, we did. President Richard Nixon, the U.S. Congress and NASA Headquarters pledged to continue support of what was then a declining space center – even threatened by closure.

Indeed, the site became the command post for the recovery effort of the entire Gulf Coast. The planning and expertise used in the Apollo Program at the facility was put to use by NASA in organizing and helping direct the monumental recovery effort to clean up and rebuild the mess left by Camille.

As the dust began to settle, new programs and new agencies were assigned to NSTL to help reestablish and stabilize the economy of the Gulf Coast.

Somewhere, an honor roll of all the center's employees of that day should be erected to recognize their unselfish efforts and to remind us that even today, we are only a twist of fate away from falling once again into harm's way.

M.R.H.



NASA NEWSCLIPS

Satellite data can help predict Rift Valley Fever outbreaks up to six months in advance – Scientists may be able to help save East Africans and their livestock from Rift Valley Fever, a mosquito-borne disease that can be fatal to humans and animals.

NASA and Department of Defense researchers have determined that rising sea-surface temperatures in the western equatorial Indian Ocean, combined with an El Nino in the Pacific, can lead to abnormally heavy rains in East Africa. These rains create a favorable habitat for the mosquitoes that carry the Rift Valley Fever virus.

Researchers at NASA's Goddard Space Flight Center in Greenbelt, Md., and the Department of Defense-Global Disease Infections System, Walter Reed Army Institute of Research in Washington, D.C., studied nearly five decades of data to produce these findings. According to their report in the July 16 issue of the journal Science, satellite data can help predict Rift Valley Fever outbreaks up to six months in advance.

Iowa State University paired with Ames to lead research – Iowa State University and researchers from Ames Research Center, Moffett Field, Calif., have been selected to head up research that could lead to better food for astronauts and safer, more nutritious packaged foods for everyone.

Iowa State will head the National Food Technology Commercial Space Center, working to improve food for long-duration space missions and to enhance the packaging, preparation and storage of commercially produced food.

NASA's Johnson Space Center in Houston will sponsor the commercial space center. The value of the five-year cooperative agreement is approximately \$2.8 million. Commercial partners in the center will provide additional resources in a collaborative effort to develop the new technologies.

As space flight evolves from short-duration shuttle missions to extended habitation aboard the International Space Station, NASA will be challenged to provide astronauts with more palatable and more nutritious food. The Agency must also find ways to decrease the weight of items to be carried to the station and to diminish the amount of waste produced. Improvements in the shelf life and safety of food for space flight could lead to similar commercial improvements.

Stennis' remote sensing program completes special report to Congress

NASA's lead center for commercial remote sensing at Stennis Space Center recently completed a report to Congress on the feasibility of private companies providing scientific data and services to the Agency's Earth Science Enterprise.

NASA Administrator Daniel Goldin delivered the report to Congress July 27.

Last October, the Commercial Space Act of 1998 directed the Commercial Remote Sensing Program (CRSP) at Stennis to carry out the study and report to Congress on the ability of commercial providers to more fully participate in NASA's Earth Science Program.

The fiscal year 1997 budget included \$50 million for an innovative effort to allow NASA's Earth Science Enterprise to buy scientific data from the commercial market. Purchasing scientific data and services from private industry can be more cost-effective than NASA's developing technology and satellites to gather the data or service.

The congressional report highlights how the Earth Science Enterprise's scientific requirements are shifting from instrument-specific capabilities to measurement specifications. This shift is significant because the long-term continuity of science measurements can be maintained independent of the measurement source. Commercial providers now have the opportunity to supply data products suitable for science investigations. Overall, the cost of science research should be reduced because NASA will not have to design, build and operate its own spacecraft. It also addressed NASA's plans to fulfill its Earth Science mission when commercial providers cannot satisfy the scientific measurement requirements.

Dr. Ghassem Asrar, NASA's associate administrator for Earth Science, said Agency officials believe commercial partnerships will result in more cost-

effective ways to meet NASA's strategic objective and ensure that its scientific discoveries and technological innovations benefit private industry and the public.

"This report explains how NASA is responding to the growing capabilities of the private sector and stimulating new thinking on opportunities for partnership," Asrar said.

"... NASA is responding to the growing capabilities of the private sector and stimulating new thinking on opportunities for partnership."

Ghassem Asrar

NASA's Associate Administrator
for Earth Science

Mark Mick, NASA project manager for CRSP at Stennis, said scientists, private companies, vendors of data and other experts were interviewed during the study to contribute their perspectives and information to the report. Mick noted that CRSP has already purchased data and services from private industry, but the congressional reports will help set the stage for continued collaborations with commercial providers leading to future data product purchases.

In 1998, Stennis awarded five commercial contracts for the purchase of remotely sensed imagery through the Scientific Data Buy Program, a demonstration program developed in response to the President's Space Policy.

Mississippi Space Services selected for Stennis contract

NASA's John C. Stennis Space Center has announced the award of a seven-year, cost-plus-incentive-fee contract to Mississippi Space Services (MSS), a joint venture comprised of Computer Sciences Corp. of El Segundo, Calif., and The IT Group, Inc., of Monroeville, Pa., to provide facility operating services at Stennis.

The total estimated contract value is \$325 million, including \$135 million for a three-year base period and \$190 million for the four one-year priced option periods.

MSS will provide a broad range of facility engineering, maintenance and operations, institutional and logistics services in support of NASA's missions at Stennis. MSS will also support programs of other resident federal and state agencies located at Stennis that share and utilize the center's facilities and services.

Other members of the MSS team include Abacus Technology Corp., Chevy Chase, Md.; Information Dynamics, Inc., McLean, Va.; Madison Services, Inc., Madison, Miss.; and Occu-Health, Inc., Ellicott City, Md.

First long-duration test successful for new hybrid motor

The first successful long-duration test of a new, 250,000-pound thrust hybrid rocket motor was conducted at NASA's Stennis Space Center in south Mississippi Aug. 13.

The motor, which represents a new way of doing business for NASA, was designed and constructed by members of the Hybrid Propulsion Demonstration Program consortium. Companies involved in the consortium are: Lockheed Martin Astronautics, Boeing Rocketdyne, Lockheed Martin Michoud Space Systems, Thiokol Corporation and United Technologies Chemical Systems Division.

The motor resembles the solid rocket boosters used on the Space Shuttle. This particular hybrid motor featured new technologies including a revolutionary new head-end combustion approach and ignition system designed by Lockheed Martin Michoud Space Systems in New Orleans.

"This long-duration test of the 250k hybrid rocket motor was an outstanding

NASA exercises Stennis contract option with Lockheed Martin Space Operations

NASA has exercised a two-year priced option on a cost-plus-award-fee contract with Lockheed Martin Space Operations, Stennis Programs, for technical support at the John C. Stennis Space Center. The total cost of the option period is \$48,850,308, and the period covered is Sept. 1, through Aug. 31, 2001.

At Stennis, Lockheed Martin manages and operates facilities and laboratories and provides related capabilities essential to the development and certification testing of large propulsion systems and components, including the Space Shuttle

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See HYBRID, Page 9

NASA takes delivery of 100th external tank from Lockheed Martin

Lockheed Martin Michoud Space Systems reached a major milestone July 22 by delivering the 100th Space Shuttle external tank to NASA.

At more than half the length of a football field and nearly 28 feet in diameter, the external tank is the single largest element of the Space Shuttle system and the only major nonreusable component.



"Delivery of the 100th external tank is a major achievement for both NASA and Lockheed Martin," said Terry Hibbard, Lockheed Martin vice president, external tank project. "It demonstrates our ability to repeatedly delivery high quality external tanks, while helping NASA meet its imperative to fly safe and meet the manifest."

The 100th external tank is the new Super Lightweight Tank configuration, first flown in June 1998. The redesigned tank consists of an aluminum-lithium alloy developed by Lockheed Martin that provides an increase to shuttle payload capacity in excess of 7,000 pounds.

Lockheed Martin is currently under contract to deliver a total of 120 external tanks to NASA. In April, NASA and Lockheed Martin agreed to a \$712 million contract for the final purchase of material needed to build an additional 60 tanks.

Director's Dialogue

*from Center Director
Roy Estess*



Then, and now

At the NASA Senior Management Council meeting several weeks ago, each center director was asked to status the center's implementation plan. In doing this, I thought it useful to emphasize for the Administrator, his staff, and other center directors the quantum change that has occurred at Stennis in the last five years – change in our mission, the scale of activity and our mode of operation. As we are each consumed with the daily challenges of our jobs, it is important to remember how very far we have come in a short period of time.

Five years ago, our mission was basically to operate the base, to perform a stand-alone commercial remote sensing effort and to conduct scientific research. Marshall Space Flight Center in Huntsville, Ala., had responsibility for propulsion testing here. Today, we are responsible for all NASA rocket propulsion testing, not only here, but also at other centers. We are responsible for a Commercial Remote Sensing Program, that is not an afterthought, but is at the heart of NASA's Earth science strategy. We are conducting scientific research in collaboration with the Navy to take full advantage of and to strengthen our unique multiagency environment.

As for scale of activity, five years ago we had four propulsion test positions, with one inactive; we had one test customer, the shuttle main engine. Today, we have 11 test positions, with none inactive and a waiting list; we have 16 test customers, 10 of whom are commercial. Five years ago, the commercial remote sensing budget was \$7.8 million. Today, it is \$25.1 million core with an additional \$23 million in initiatives. Today, we are involved in numerous and significant Agency initiatives such as ISO, IFMP, ODIN, NPD 7120.5, etc.

As for mode of operation, five years ago we were government-owned and contractor-operated to support the NASA mission. We still are, but now we also support significant commercial propulsion operations. A commercial company is currently investing tens-of-millions-of-dollars in facilities at Stennis. Others may follow.

Five years ago, we had a staff of 212 civil servants. Today, our staff is approximately 260. No wonder we're so busy. I'm very proud of your efforts that have gotten us this far! Because of your continued hard work, we have a bright future in making significant contributions to both America's space program and to the nation's well-being.

NASA project provides accessibility to Web browser for the blind

In NASA's work to find commercial applications for space-related technology, a new way has been found to give the blind a license to drive on the information superhighway.

The development of Iliad, an electronic information assistant that retrieves and processes information from the Internet using e-mail, has proven a useful innovation in allowing blind and visually impaired people access to information on the World Wide Web.

NASA's Technology Transfer Office at Stennis Space Center has funded a project to enhance the accessibility of Iliad to this audience. The Rehabilitation Research and Training Center (RRTC) on Blindness and

Low Vision at Mississippi State University in Starkville possessed the perfect environment and expertise to provide these enhancements.

"Stennis Space Center is pleased to serve as a gateway to NASA technology, and this project with Johnson Space Center and Mississippi State University is an exciting example of making technology available for the greater good," said Kirk Sharp, NASA technology transfer officer at Stennis.

The mission of the RRTC at Mississippi State is to prevent or alleviate the vocational, economic and personal effects of blindness and severe visual impairment.

Originally designed five years ago by a

team of NASA scientists at Johnson Space Center in Houston, visually impaired users send an e-mail message to the Iliad home address and type in the search request using keywords. Iliad uses the keywords to query search engines on the Web and e-mails results back to the requestor without having to use a graphical browser.

"Computer users who are blind or severely visually impaired realize that cyberspace is jammed with exciting information," said Brenda Cavanaugh, a research scientist with the RRTC at Mississippi State. "Unfortunately, the vastness and highly graphical nature of its

NASA awards Virginia firm \$2.04M contract

NASA recently awarded a Virginia firm a three-year \$2.04 million contract to deliver polar ozone and aerosol data to the Agency's Earth Science division.

Computational Physics Inc. (CPI) of Fairfax, will deliver high-resolution data derived from the Polar Ozone and Aerosol Monitor III (POAM III) instrument.

"The POAM III data will be used by NASA's Earth Science community to study the long-term trends of the ozone layer," explained Vicki Zaroni, a project engineer with NASA's Commercial Remote Sensing Program (CRSP) at Stennis Space Center. "The polar ozone data will be submitted to NASA on a monthly basis beginning this month."

As NASA's lead center for commercial remote sensing within the Earth Science Enterprise, Stennis will administer the contract with CPI. Zaroni said, NASA expressed a need for polar ozone data to support ongoing research and CRSP looked to industry to fill that need.

"Stennis had the expertise in data buys and negotiated the contract on behalf of the Earth Science Enterprise," said Jack Kaye, director of NASA's research division in the Office of Earth Science in Washington, D.C.

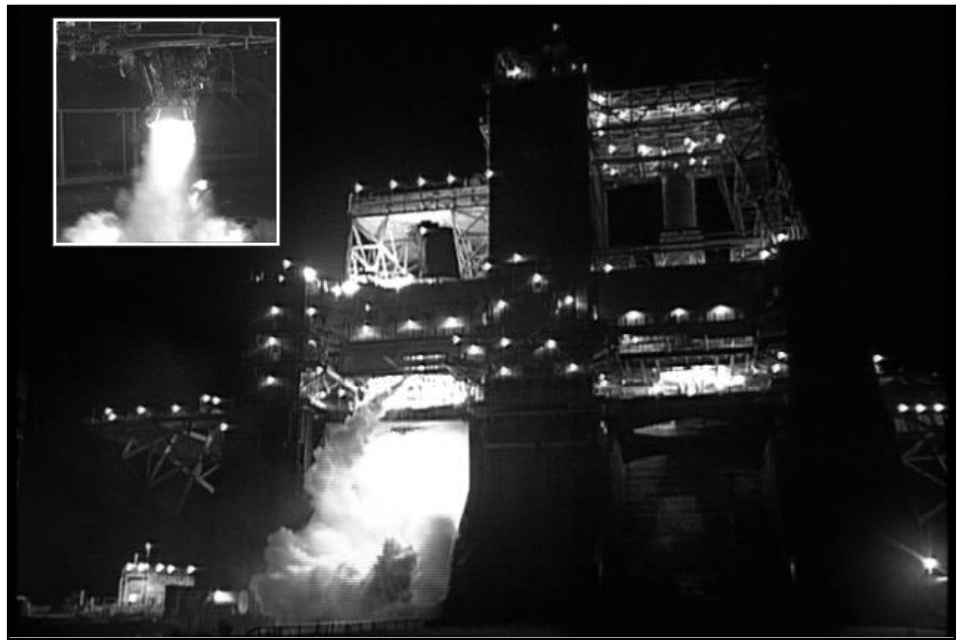
The data will also be available to the public for use by research groups, universities, NASA centers, international and other investigative groups studying the ozone layer depletion, Kaye added.

E.W. Chappell, CPI's chief operating officer, said the POAM III will take ozone readings by looking through the Earth's atmosphere and taking measurements at different levels.

Originally developed by the Naval Research Laboratory in Washington, D.C., the POAM III was launched on board the French satellite, SPOT4.

"This information is critical because it allows us to determine concentrations of ozone at various and different altitudes," Chappell explained. "The data will include profile facts of the ozone layer, nitrogen dioxide, water vapor and aerosol extinction."

Chappell added that data gathered by POAM III would also help predict and determine the underlying causes of global warming and determine if reduction in the



The Propulsion Test Article (PTA1) for the Low Cost Technologies project undergoes its first hot-fire test Aug. 2 in the B-2 test stand. Both photographs, taken from video footage of the firing, show the 60,000-pound thrust Fastrac engine that achieved ignition during the three-second test. The PTA1 is a flight-like demonstration of the first stage of a two-stage rocket concept and a testbed for low-cost technologies to reduce the cost of access to space.

Test article successfully completes first firing

The first hot-fire test series on the Propulsion Test Article (PTA1) for the Low Cost Technologies Project has begun on the B-2 test stand.

With the 60,000-pound thrust Fastrac engine in a vertical test position, the first hot-firing/ignition test was successfully conducted for three seconds late in the evening Aug. 2.

"The key test facility and test article parameters appeared to be nominal," said Richard King, NASA's project manager for the Low Cost Technologies Project at Stennis Space Center. "All objectives were met."

The number of Stennis personnel that were instrumental in getting the PTA1 to its first test is too numerous to name. However, Dr. Don Chenevert is the lead project engineer for the Low Cost Technologies project. John Stealey is the B-2 test stand test director. Barry Robinson and Gary Benton were test conductors on the long countdown for this milestone test.

"The Johnson Controls, Rocketdyne and Lockheed Martin contractors have worked side-by-side with the NASA test team for the past two years and are a major reason for the program success to date," King said.

The test article is a flight-like demonstration of the first stage of a two-stage rocket concept and is a ground

testbed for low-cost technologies to reduce the cost of access to space. It weighs approximately 75,000 pounds without propellants and approximately 125,000 pounds loaded with propellants.

Personnel from Marshall Space Flight Center in Huntsville, Ala., designed the 60-foot tall test article. It consists of a square tubing structural housing, liquid oxygen and RP-1 propellant tanks and delivery systems, thrust measurement system, thrust vector control/gimbaling system, avionics equipment and power distribution systems.

Starting in 1997, the NASA and contractor team at Stennis built the PTA1 structure and assembled all the Propulsion Test Article systems into a final, integrated test article. Operations engineer Bryon Maynard was instrumental in assembling the PTA1. The Stennis team completed several propellant loading and wet simulated countdown tests during the activation period prior to the first hot-fire test.

Upon completion of development tests and flight certification tests in the next several months, the Fastrac engine will power the new, unpiloted X-34 technology demonstrator. The X-34, a suborbital winged vehicle, will be launched at 38,000 feet altitude from a modified L-1011 airliner. The latest schedule shows powered flights of

Wethington places value on creating working relationships

Mike Wethington has recently joined NASA as a Management and Program Analyst in the Procurement and Business Management Office. Beyond his primary function as serving as the cost estimating expert for SSC, he is the Management Representative for Quality responsible for maintaining ISO 9001 certification and expanding the scope of SSC's certification.

"Our motto has been: 'Say It! Do It! Prove It!' We are adding a new element first expressed by Mark Craig, Stennis' deputy director. 'Improve It!'," said Wethington

It is senior management's desire to involve as many people as possible in the ISO internal audit process, he said.

"Ideally, we'd like representatives from every organization to be involved on an audit. It has been my experience that when you work in detail with someone from another department or area, you develop a relationship that was not there before," Wethington said. "It is in creating those working relationships that help day-to-day operations run smoother. I want to encourage folks to volunteer."

Wethington said Craig's 'Improve It!' initiative has its roots in recognizing the need for greater involvement, at all levels, at Stennis.

The creation of the Bright Ideas program, a site-wide, Internet-based suggestion box, is an example of senior management's interest in having an active mechanism in place to listen to employees.

"Working with someone from another department helps to develop a relationship that helps day-to-day operations run smoother."

Mike Wethington



"The Bright Ideas program is like a one-stop clearing house for good ideas, suggestions and complaints," Wethington said. "If you have a suggestion or concern you can submit it to Bright Ideas via the SSC intranet home page. A tracking number will be assigned and an answer or acknowledgment will be made."

Wethington explained there is more to the ISO 9001 certification and Stennis' commitment to listening and responding to the work force. He said the accountability factor has value for people in their lives, as well as in their jobs.

"Many of us want the benefits of success, but not everyone wants the accountability that comes with responsible success," he said. "Stennis is accepting a significant challenge in committing itself to a continued process of 'Say It! Do It! Prove It!' and now, 'Improve It!'"

While Wethington's ISO responsibilities are just a portion of his job at Stennis, the accountability factors

SSC Employee Profile



dovetail perfectly into his role as the cost estimating expert for business development.

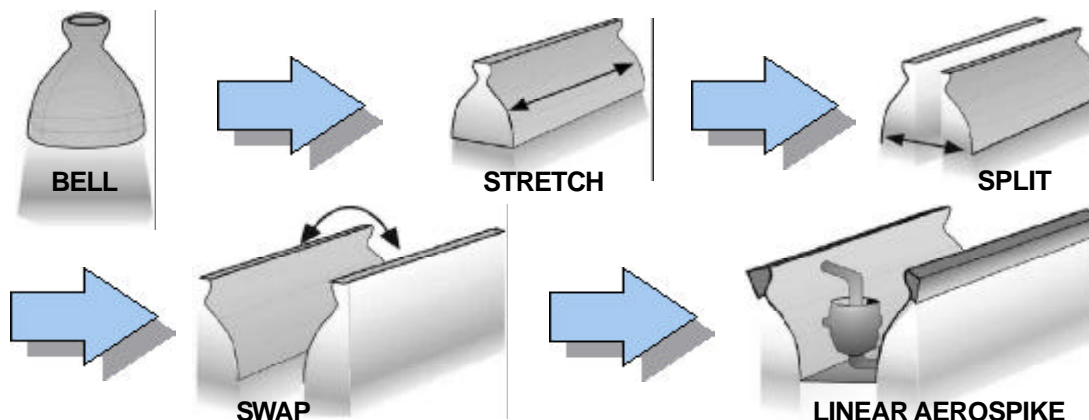
"More and more NASA propulsion work is moving to a commercial environment," he explained. "We are constantly looking to present our testing expertise and facilities to the likes of Boeing or Lockheed for their commercial ventures."

Wethington works toward establishing base costs and options for marketing Stennis facilities and/or personnel to test new engine designs. "The E Complex is rapidly becoming the testbed for a whole new generation of emerging technologies," he said. "Stennis can provide facilities and experts that are competitive to existing commercial testing programs."

Wethington is a graduate of Texas Tech in Lubbock, and Florida Institute of Technology in Melbourne. He lives in both Picayune, and Red Bay, Ala., where his wife, Nancy, teaches special education. The Wethingtons have two children and a brand new granddaughter, Elizabeth, who according to her grandfather, runs the show.



XRS-2200 Linear Aerospike Engine: Converting Bell to Linear



This graphic illustrates the concept and the technology that makes an aerospike engine similar to and, at the same time, different from a conventional rocket engine. The aerospike engine for the X-33 is being prepared for its first test at Stennis Space Center.

Remote sensing/workforce development

Stennis' model programs go national

NASA's John C. Stennis Space Center is taking remote sensing training and workforce development nationwide with a major announcement during the U.S. Department of Education's annual America Goes Back to School program in Chattanooga, Tenn., Aug. 31.



Dr. David Powe



David Brannon

both Stennis and the schools participating in the pilot program.

In Chattanooga, David Brannon, Commercial Remote Sensing program manager at Stennis, and Dr. David Powe, chief of the Education and

University Affairs Office, along with U.S. Secretary of Education Richard Riley will announce the national rollout for Workforce Development Education and Training.

Two years ago, Stennis, NASA's lead center for commercial remote sensing, unveiled the Workforce Development Education and Training (WDET) program. The Mississippi Model, as the program is also known, features a pilot program, which when fully implemented will bring remote sensing technology to every Mississippi student by 2003. During the past year, WDET has garnered national attention, with representatives from various states visiting

Each year, Riley sponsors the America Goes Back to School program to spark more interest in the American education system. In addition to the announcement by NASA's Stennis Space Center, this year's program will feature the premiere of the Mars Millennium Project and a three-day, eight-state bus tour. Brannon and Powe will also represent Stennis on the tour.



The NASA Summer Faculty Program provides a means for college faculty to conduct research, design studies, engage in product development and other activities in conjunction with Stennis scientists and engineers during a 10-week period in the summer. This year, participants were engaged in activities ranging from remote sensing and education to propulsion. Pictured front row from left: Eddie Hildreth, Summer Faculty Program co-director, Southern University; Doris Jones, Langston University; Fernando Figuero, Tulane University; Voletta Williams, Alcorn State University; Kelly Knowlton, Northwestern State University of Louisiana; and Dr. Ramona Pellitier-Travis, university affairs officer for the NASA Education and University Affairs Office at Stennis. Back row: Mike Witiw, Florida Institute of Technology; Steve Griffin, University of Memphis; Dan Zwerg, Mississippi Gulf Coast Community College; Louis Roemer, Louisiana Tech University; Jim Miller, Summer Faculty Program co-director, University of Southern Mississippi; Julius Baham, Jackson State University; Ervin Otvos, University of Southern Mississippi; John Schmalzel, Rowan University; and Dr. Armand Joyce, Summer Faculty Program co-director.

NASA Employee Appreciation Day scheduled Aug. 26

In the tradition of the legendary Stennis bed race, tug of war and balloon toss, NASA managers will once again feed and fete their employees with a picnic and volleyball tournament, beginning at 4 p.m., Thursday, Aug. 26 at the Cypress House Pavilion.

"Each year, the NASA managers recognize the outstanding performances of their employees with a picnic," said Marina Benigno, Stennis' chief financial officer. "This year's picnic will feature barbecue ribs, hamburgers and sausages with all of the fixings."

The volleyball tournament will begin at 5 p.m. Benigno explained the volleyball competition is in keeping with the bed race competition, the tug of war and the balloon tosses from previous NASA Employee Appreciation Picnics.

For additional information, contact Marina Benigno at ext. 2387.

Herring selected to lead Gulf Coast Education Initiative

Dr. Dewey Herring made his first visit to Stennis Space Center recently as executive director of the Gulf Coast Education Initiative Consortium.

The Gulf Coast Education Initiative Consortium is a partnership between NASA at Stennis Space Center, the University of Southern Mississippi and 19 school districts along the Mississippi Gulf Coast and in St. Tammany Parish, La.

Herring, former superintendent of the Ocean Springs School District, replaces Dr. Tom Burnham, who left the consortium in July for a position with the Henderson County, N.C., School District.

As superintendent, Herring was active in the consortium, serving as first vice chair of the consortium's board of directors. He also served as president of the Gulf Coast Superintendent's Conference, the predecessor of the education consortium.

Proposed budget cuts threaten NASA space exploration programs

Earlier this month, a House panel recommended legislation that would cut \$1.4 billion from the fiscal year 2000 NASA budget.

The panel's action was only the first step in the lengthy appropriations process, but it represents the serious challenges that face Congress and the White House this year as they attempt to stay within the spending limits previously agreed to as part of the Balanced Budget Act.

The House Appropriations Committee restored \$400 million of the cuts on July 30. The bill will be considered by the full House of Representatives in September and later by the Senate.

Reductions of this magnitude recommended by the House subcommittee would have devastating effects on the space agency and would result in serious impacts on Stennis Space Center, according to Roy Estess, Stennis Space Center director.

At the very least, Stennis' Commercial Remote Sensing Program and Earth Science program would be eliminated and all new propulsion development would stop, Estess said. Several hundred people could lose their jobs.

Stennis Space Center employs 4,200 people. In 1998, Stennis had an economic impact of \$366 million within a 50-mile radius of the center.

In the past five years, NASA has streamlined its budget, which resulted in the Agency returning approximately \$35 billion to the Department of the Treasury. During that same period, NASA has reduced Agency personnel by almost a third, while continuing to increase productivity. As a result of inflation, NASA's buying power has also decreased by one third.

If budget cuts of this magnitude were enacted, the results could have lingering effects for years to come.

"The technology we develop is for the future," said Mark Craig, Stennis Space Center deputy director. "As a nation, we need to be doing those kinds of things for our future and our children's future. And because NASA only receives eight-tenths of a cent per tax dollar, I believe that's a good investment."



Twenty-eight teachers from across the United States and France recently participated in the NASA Educational Workshops (NEW) at Stennis Space Center. NEW is a two-week honors program that places teachers in direct contact with NASA science and engineering professionals and those of other resident federal agencies at the space center to expose the teachers to current, state-of-the-art research in space science, technology and the environment. This year marked the first time that international teachers participated in the NEW program at Stennis Space Center. Stennis hosted two teachers from France during the two-week session. Pictured front row from left: Liliana Klass, Lenore Hogaboom, Laura Allen, Diana Smith, Rebecca Moore, Patricia Waddell-Reeves, Paula Reed, Nisha Ritchie, Claude Castelin and Catherine Paumier. Second row: Sandra Everhart, Susan Chapman, Paula Evans, Cheryl Warren, Cherylle Wallace, Clayton Haskell, Bonnie Fertig, James Odden and Benjamin Summers. Back row: Dwight Sieggreen, Christopher Heitkamp, Michelle Garza, Glenda Miller, Belinda Moore, Pat Deborah, Kay Smith, Cindy Ernst, Tim Ernst and David Livingston.

WORKSHOP...

(continued from Page 1)

put out equal amounts of fertilizers, pesticides and herbicides across whole fields. Now, with precision farming, I only put out what's needed."

Precision farming, as used by Hood, is a rapidly emerging commodity production system in which crop inputs such as seed, fertilizer and pesticide are applied only to specific areas where they are needed, rather than general application across an entire field.

Stennis Space Center is NASA's lead center for commercial remote sensing. Remote sensing uses instruments mounted on satellites or aircraft to capture detailed images of the Earth that can reveal features not apparent to the human eye. These pictures are analyzed, and the extracted information is used to support decision-making in agriculture and forestry, as well as such diverse market areas as insurance, banking, real estate and environmental monitoring.

Faced with 25-year lows in commodity prices, the growers, who gathered for

the first time to collaborate, expressed urgency in finding ways to make this technology available to the associations' producer members as soon as possible.

"Looking at the possibilities of the technologies and the science and chances for broader crop application, I think this is just a tremendous opportunity. In addition to the discussions we have here, we will begin to think of ways to make sure our producer community remains viable for the long term," said Gonzales.

"The decision tools that come from this dialogue in making this technology reliable, confident and marketable to the growers, will hopefully be the beginning of a process that will, over the next decade, become the norm in terms of farming and commodity production," said Asrar.

The workshop, held to better understand and prioritize the informational needs of farmers, was a function of a USDA - NASA partnership initiative devoted to significantly increasing the application of NASA's remote sensing data, information, science and technologies to societal needs, ensuring maximum return on taxpayer investments.

WEB BROWSER...

(continued from Page 4)

resources often make it difficult to locate specific topics."

There is no charge and no minimum computer requirement to use the Iliad Web site service. Users need only have a computer, a modem of any speed and an Internet service provider to access the site. Iliad is also accessible via mobile phone.

To receive instructions on using Iliad, send an e-mail message to iliad@msstate.edu, iliad@prime.jsc.nasa.gov or iliad@rosy.tenet.edu. Leave the subject line blank, and type "start iliad" (no quotes) in the body of the message. For more information, call (601) 325-2001.

For more information on the NASA Technology Transfer Office at Stennis, or to find out about NASA-developed technologies available for public license and use, call (228) 688-1929, or access the Web site at <http://technology.ssc.nasa.gov>.

HYBRID...

(continued from Page 3)

success," said NASA's Robert Bruce, project manager of the Hybrid Propulsion Demonstration Program at Stennis Space Center. "We're very happy to see our customer (the consortium) experience such great success, since they've been working on this program for so many years. The Stennis test team did an outstanding job."

This was the second of several tests that will be performed on two separate Hybrid Propulsion Demonstration Program hybrid motors.

LOCKHEED...

(continued from Page 3)

Main Engine and other future development propulsion programs.

Lockheed Martin also conducts research and development in propulsion test technologies involving cryogenics, high-pressure gas, metrology, advanced instrumentation and sensor systems, and engine diagnostics.

Other services include supporting NASA goals in environment systems, sciences and observations, technology applications, development and commercialization of remote sensing.



In celebration of Eileen Collins' command of STS-93, Stennis personnel shared their personal and work experiences with some 250 visitors and Girl Scouts from Mississippi and Louisiana on July 19. A panel of women professionals focused on women's roles in science and engineering. Participating from Stennis were from left, Dr. Ramona Pellitier-Travis, university affairs officer, Education and University Affairs Office, NASA; Karen Lee, test operation engineer, NASA; Christina Palmisano, propulsion assembly engineer, Boeing; Charlotte Timmons, multimedia lead, Lockheed Martin; Paulette Lovingood, chief, human resources and management services office, NASA; and Marina Benigno, chief financial officer, NASA. Not pictured, Florence Kailiwai-Barnett, director of Center Operations, NASA, who greeted visitors.

Program focuses on women's roles in space; celebrates Collins' command

More than 250 visitors and Girl Scouts from Mississippi and Louisiana took part in the celebration of female astronaut Eileen Collins' command of STS-93 July 19.

Throughout the evening, visitors participated in a number of activities the highlight of which was a panel discussion of Stennis women professionals focusing on the key roles women engineers and scientists play in the space program.

Visitors gathered to witness a simulcast of the live Space Shuttle launch from Kennedy Space Center. It was to be the first shuttle mission to be commanded by an American female astronaut, U.S. Air Force Col. Eileen Collins.

At seven seconds before lift-off, NASA postponed the scheduled launch of Columbia, but the spirits of all attending were not dampened. Larry Ellis, deputy director of Stennis' Propulsion Test Directorate, explained to participants how the shutdown in the launch program was initiated for the safety of the astronauts.

The launch delay was caused by a hazardous gas detection system indicating a high concentration of hydrogen in Columbia's aft engine compartment—more

than double the allowable amount—causing a scrub in the launch attempt.

Launch managers later determined that the hydrogen concentration indication was false.

Columbia lifted off into the night sky on July 22 carrying five astronauts to orbit for the deployment of the Chandra X-Ray Observatory, designed to unveil previously invisible mysteries of the universe.

During the mission to deploy the third of NASA's four great observatories, launch photos indicated a hydrogen leak coming from the nozzle of the right Space Shuttle Main Engine.

After Columbia landed, engineers went to work to determine whether a hydrogen leak had actually occurred in the engines and what may have caused it. They discovered that the overall reduced performance was, in fact, caused by a hydrogen leak in one engine.

The leak came from small holes in three out of the more than 1,000 cooling tubes that circulate hydrogen around the nozzle.

The damaged area of the right engine was removed from the nozzle and sent to Boeing Rocketdyne Propulsion & Power in Canoga Park, Calif., for further analysis.

Safety Corner

Travel tips

Government employees frequently have to travel. Here are some tips to make the trip a safe one:

Airports

1. Check-in lines: Always keep your baggage wedged between your feet or have a hand on your laptop at all times.
2. Security checkpoints: Don't put your laptop on X-ray conveyor belts. Instead, hand it to a security officer.
3. Shuttle buses: Even though these buses often provide a specific area to store bags, while going to and from the airport and parking lots, it's best to keep your belongings with you.

On the Road

1. Trust no one. If an unmarked car signals you to pull over, turn on your hazard lights and drive slowly to a well-lit or more populated area. Keep your doors locked and windows up and ask to see the officer's badge and identification. A police officer will understand your caution.
2. Don't get out of the car. If someone signals that there is a problem with your car, thank the person through the window. Don't get out to check. Instead, keep driving until you get to the nearest gas station.
3. Stay alert, especially at intersections and parking lots. These are prime areas for carjackings.

QUICK LOOK

■ The Federal Women's Program will hold its Women's Equality Day Luncheon at 11:30 a.m. Aug. 26 in the Building 1100 Atrium. The guest speaker will be Alma Esparza, executive director of the Board of Directors Federally Employed Women. Tickets are \$12. For more information, call Ext. 2123.

■ The Stennis Space Center Mardi Gras Krewe is accepting applications for new members for the upcoming parade season. For more information, contact Kay McArthur at Ext. 1362 or Barbara Marino at Ext. 1378.

■ The Federally Employed Womens' Outreach Program at Stennis requests your support for Hope Haven. Hope Haven is an emergency children's safe shelter licensed to house up to nine children. It provides medical, dental and psychological services; provides clothing, personal supplies and school items. The shelter serves 15,000 individual meals and snacks per year and is open seven days a week. Hope Haven is the only non-profit shelter on the coast. For more information, call Ext. 2364.

■ A blood drive will be held from 9 a.m. until 3 p.m. Sept. 28-29 in the Conference Center, Bldg. 1100. The goal is 250 pints. No appointment is necessary. For more information, call Ext. 1468.

DATA BUY..

(continued from Page 5)

use of fluorocarbons and other ozone destroyers has affected the ozone hole.

"Once NASA receives the data, it will be available for research by NASA's Earth scientists," Zanoni added. "The continuous measurements provided by POAM III will enable scientists to continue important environmental research and will help them to better understand ozone conditions."

The POAM III records 28 measurements of ozone levels per day – 14 measurements each from the Southern and Northern hemispheres.

The recent data buy is the latest contract to be awarded to a private company by CRSP at Stennis Space Center.

"NASA is getting into the business of purchasing data because we believe that commercial industry can serve many of NASA's needs," Zanoni said. "And, in many cases, private industry can provide the data more cost effectively."

PTA1...

(continued from Page 5)

the X-34 beginning in May 2000.

Stennis Space Center's role in testing the new engine for the X-34 is part of the Low Cost Technologies project, a joint effort between Marshall and Stennis.

LAGNIAPPE

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